UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/880,859	06/15/2001	Martin E. Lee	102305.05	7353

7590 12/28/2001

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, VA 22320

EXAMINER
RO, BENTSU

ART UNIT	PAPER NUMBER
2837	

DATE MAILED: 12/28/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO File

Office Action Summary	Application No.	Applicant(s)	
	09/880,859	LEE, MARTIN E.	
	Examiner	Art Unit	
	Bentsu Ro	2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 November 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *34-157* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *34-157* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4 and 6* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

FIRST OFFICE ACTION

1. The restriction requirement is withdrawn in view of applicant's remarks. Claims 34-157 will be examined in their entirety.

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims (first group claims 34-39, 43, 45, 46, 56, 57, 59, 60-62, 71), (second group claims 72-81, 83, 85, 86, 96, 97, 99, 100, 102), (third group claims 104-107, 109, 130-132), and (fourth group claims 133-136, 138, 139, 144-149, 154) are rejected under 35 U.S.C. 102(b) as being clearly anticipated by **Phillips US Patent No. 4,383,757.** (This is a new reference.)

The following chart shows the comparison of the first group claims with Phillips teaching.

The first group claims:	**Phillips teaching:**
34. A method of making a microlithography system that forms an image onto an object, comprising the steps of:	Phillips teaches a method and an apparatus for making a microlithography system that forms an image onto an object; the object reads onto Fig. 1 the wafer 33;
providing an irradiation apparatus that irradiates the object with radiation to form the image on the object;	Fig. 2A shows an irradiation apparatus (or the focus detector 11); the radiation apparatus includes a mercury lamp 18, optical fibers, beam splitters 15, 17, projection lens 13, detectors 29, 31, and the associated circuit elements;
providing a movable stage associated with the irradiation apparatus;	Fig. 1 shows a lens positioning apparatus 107; the movable stage could read onto several different elements, for example, the projection lens 13 (Fig. 1), or the projection lens enclosure 113 (Fig. 9), or the base 109 (Fig. 9), or the reticle holder 117; etc.

providing a first support structure;	again, the first support structure could read onto several different elements, for example, Fig. 9 the support structure 129 (or casting 129) or the granite block 101;
providing a second support structure dynamically isolated from the first support structure;	the second structure could read onto the kinematic lens positioning apparatus 107, or any element inside the positioning apparatus 107, such as the vertical bars 115 (Fig. 9), the reticle holder 117, the base 109, or the combination of the elements; it is very important to note that the position apparatus 107 is dynamically isolated from the casting 129 by air bearings 119, 121, 123, 125, 127, etc. shown in Figs. 10A and 10B;
providing a drive to move the movable stage	Fig. 12 shows a servomotor 175, a ball screw 171, and a ball nut 185; these elements together is a drive to move the lens positioning apparatus 107;
such that a reaction force exerted by the movement of the movable stage is transferred to the first support structure; and	as explained previously, and also shown in Figs. 1 and 9, the drive (Fig. 1) is fixed to the casting 129 (Fig. 9), therefore, any reaction force produced by the servomotor 175 (Fig. 12) is automatically transferred to the casting 129;
providing a position detector to detect a position of the movable stage,	Fig. 1 shows a focus detector 11; Fig. 2A shows the details of the focus detector 11;
the position detector being supported by the second support structure.	the focus detector 11 is supported by the lens positioning apparatus 107, as clearly shown in Fig. 1.
35. A method according to claim 34, wherein the second support structure supports the irradiation apparatus.	Fig. 1 shows that the focus detector 11 is supported by the lens positioning apparatus 107.

36. A method according to claim 35, wherein the irradiation apparatus includes a projection system.	Fig. 2A shows a projection system, including a mercury lamp 18, two light sources 19, 21, light beams, beam splitters 15, 17, projection lens 13, detectors 29, 31, and control circuit.
37. A method according to claim 36, wherein the projection system optically projects the image.	the mercury lamp is an optical light source, therefore, the projection system is an optical system for projecting an image onto the wafer 33.
38. A method according to claim 36, wherein the movable stage is located below the projection system.	Fig. 9 shows a base 109, which is a movable stage; the base 109 is located below the beam splitter 15.
39. A method according to claim 35, wherein the irradiation apparatus includes a mask holder that holds a mask that defines the image.	Fig. 9 shows a reticle holder 117 which holds a reticle 35.
43 and 46. A method according to claim 34, wherein the movable stage is a guideless stage having no associated guide member to guide its movement.	None of Phillips Figs. 1, 9, 12 shows any guide member, therefore, Phillips' movable stage is a guideless stage.
45. A method according to claim 34, wherein the movable stage is provided on the second support structure.	Fig. 9 shows the movable stage (base 109 or reticle holder 117) on the position apparatus 107.
56. A method according to claim 34, wherein the second support structure is supported on a foundation.	Fig. 9 shows a granite block 101, the block 101 supports the complete system, including supporting the lens positioning apparatus 107 and the casting 129.
57. A method according to claim 56, further comprising: providing a block between the foundation and the second support structure.	Fig. 9 shows a stage 103.

59. A method according to claim 56, wherein the foundation is the ground or a base structure.	Fig. 9 shows a granite block 101, which is a base structure.
60. A method according to claim 34, wherein the drive comprises a linear motor.	A very strict definition of a linear motor is a motor constructed in a linear fashion, however, in many cases, a rotary motor with a ball screw and a ball nut all together could be called a linear motor; Phillips teaches a linear motor of the second type.
61. A method according to claim 60, wherein the linear motor comprises a magnet and a coil.	All synchronous motors have magnets and coils.
62. A method according to claim 61, wherein the first support structure supports one of the magnet and the coil.	Figs. 1 and 9 show the casting 129 supporting the drive; the drive includes the servo motor 175 (Fig. 12); the servo motor 175 includes both magnets and coils; further, the servo motor 175 is support by the casting 129.
71. A method according to claim 34, wherein the first support structure at least partly supports the drive.	Same reason as claim 62 above; it is noted that the casting 129 supports the servo motor 175, therefore, the first support structure (the casting 129) at least partly supports the drive (the servomotor 175).

The second group claims 72-81, 83, 85, 86, 96, 97, 99, 100, 102, the third group claims 104-107, 109, 130-132, and the fourth group claims 133-136, 138, 139, 144-149, 154 are all similar to that of the first group claims 34-39, 43, 45, 46, 56, 57, 59, 60-62, 71. Explanation of the second through fourth group claims are therefore omitted.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims (first group 44, 47, 51, 52), (second group 84, 87, 91, 92), (third group 114-120), and (fourth group 150, 156, 157) are rejected under 35 U.S.C. 103(a) as being unpatentable over Phillips.

Regarding claims 44, 51, 84, 91, 114, 115, Phillips teaches a movable stage that moves the reticle 35, see Fig. 9. Phillips does not teach a movable stage that move a substrate. However, the same structure can obviously be used for moving a substrate stage.

Regarding claims 47, 52, 87, 92, 120, 150, Phillips' vertical movement structure obviously could be rotated 90° for the horizontal movement. The air bearings 119-127 (Fig. 10A) could support the structure in a vertical direction for horizontal movement.

Regarding claim 116, Phillips shows beam splitters 15, 17. Phillips does not show any mirror. However, a mirror can be inserted in the Phillips optical path to change the optical direction, if needed.

Regarding claims 117, 119, the Phillips' stage is a guideless stage.

Regarding claim 118, Phillips' movable stage (base 109, Fig. 9) is provided on the positioning apparatus 107.

Regarding claim 156, the first member could read onto the ball screw 171 (Fig. 12) and the second member could read onto the ball nut 185. Alternatively, the first member could read onto the rotor of the servo motor 175, the second member could read onto the same ball nut 185.

Regarding claim 157, if the rotor is read as a first member, then the rotor is a permanent magnet rotor, and therefore, meets the limitation of claim 157.

6. Claims (first group 34-57, 59-63, 65-67, 69-71), (second group 72-97, 99, 100, 102, 103), (third group 104-107, 109, 110, 112, 114-124, 126, 127, 129-132), and (fourth group 133-136, 138-140, 142, 144-154, 156, 157) are rejected under 35 U.S.C. 102(b) as being clearly anticipated by **Hinds US Patent No. 4,654,571.** (This is a reference cited by applicant in the PTO-1449, paper #4, sheet #5 of 11.)

The following chart compares applicant's claim 34 (the most comprehensive claim) with Hinds teaching.

Claim 34:	**Hinds teaching:**
A method of making a microlithography system that forms an image onto an object, comprising the steps of:	Hinds Fig. 1 shows a complete system and method for making a microlithograph onto an object; the object reads onto the wafer 14;
providing an irradiation apparatus that irradiates the object with radiation to form the image on the object;	Fig. 1 shows a photo head 16, the photo head 16 irradiates image onto the wafer 14, see text column 1, line 16, for example;
providing a movable stage associated with the irradiation apparatus;	the platform 10 is a movable stage; alternatively, the device that holds the wafer 14 could also be read as a movable stage;
providing a first support structure;	the table surface 20;
providing a second support structure dynamically isolated from the first support structure;	the platform 10; it is noted that the platform 10 is dynamically isolated from the table surface 20 by air bearings 12, namely, there is no mechanical contact between the platform 10 and the table surface 20;
providing a drive to move the movable stage	Fig. 2 shows coils 64-67;
such that a reaction force exerted by the movement of the movable stage is transferred to the first support structure; and	in order for the platform 10 to move, the coils in the platform 10 must exert a force toward the magnets 22 on the table surface 20, the magnets 22 absorb the reaction force and push the coils forward to move the platform 10; therefore, the reaction force is absorbed by the table 20;
providing a position detector to detect a position of the movable stage,	the laser interferometer 32, 33, 34;
the position detector being supported by the second support structure.	the interferometer is located to the table 20 and fixed to the table 20.

Regarding claims 35, 40, 41, the photo head 16 is supported by the table structure 20. It is noted that the photo head 16 cannot be supported by the platform 10 because the platform 10 must move relatively to the table 20 for receiving image from photo head 16. The photo head 16 must be fixed to the table 20.

Regarding claims 36 and 37, the photo head 16 is an optical projection system.

Regarding claim 38, the platform 10 is located below the photo head 16.

Regarding claim 39, Fig. 1 shows a photomask 17.

Regarding claim 42, the first mirror reads onto the reflectors 40-42, the second mirror reads onto the mirror 46.

Regarding claims 43, 46, 65, 69, the magnets 22 are fixed to the table 20, the coils 64-67 and the air bearings 12 move freely over the table 20 without any guidance system.

Regarding claims 44, 51, 66, 70, the wafer 14 is a substrate.

Regarding claim 45, the movable stage and the second support structure together read onto the platform 10.

Claim 47 reads onto Hinds teaching as follows:
A method according to claim 46, wherein the second support structure (the platform 10) includes a base member (the air bearings 12, see Fig. 2), the guideless stage is movable over a surface (the surface of the air bearings 12) of the base member on a bearing (the air bearing 12 pushes the platform 10 upward by flowing air so that the platform 10 can be moved freely by the force of the magnets/coils interaction.)

Regarding claims 48, 49, 53, 54, the air bearings 12 is a non-contact supporting device.

Regarding claims 50, 55, the magnets 22 and the coils 64-67 provide non-contact bearing.

Claim 52 reads similar to that of claim 47 shown above.

Regarding claims 56, 57, 59, all equipments must be supported by a foundation, including Hinds system.

Regarding claims 60, 61, 62, the coils 64-67 and the magnets 22 together constitute a linear motor.

Regarding claim 63, Hinds system includes the rotation of the platform 10, see column 1, last line; column 3, line 38; column 5, last line, the angle θ; etc.

Regarding claim 67, Fig. 1 shows X and Y servo circuits 58. Column 5, last line describes X, Y positioning.

Regarding claim 71, the table 20 supports the magnets 22. It is noted that magnets 22 is a part of the drive, in that the magnets cooperate with the coils to move the platform 10.

The above rejections explain the first group claims. The second, third, and fourth group claims read similar to that of the first group claims, explanations are therefore omitted.

7. Claims 58, 98, 108, 137 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hinds as applied to first through fourth groups claims above, and further in view of **Kembo et al US Patent No. 4,803,712.** (The Kembo reference is cited by applicant in the PTO 1449, paper #4, sheet 7 of the 11 sheets.)

Regarding these claims, Kembo et al Fig. 3 clearly shows a vibration isolator 11, position between the floor 1 and the system above vibration isolator 11. In view of the Kembo et al teaching, it would have been obvious to a skilled person in the art to add such a vibration isolator to Hinds system, if the floor of the Hinds system is indeed required such a vibration isolator.

8. Claims (first group 34, 63, 64, 67, 68), (second group 72, 101), (third group 104, 110-114, 125, 127, 128), and (fourth group 133, 139-145, 155) are rejected under 35 U.S.C. 103(a) as being unpatentable over **Salter et al US Patent No. 4,980,718.** (This is a new reference.)

OR ALTERNATIVELY

These claims are rejected under 35 U.S.C. 103(a) as being unpatentable over Salter et al in view of the general arrangement of elements and the structure of Hinds 4,654,571 patent cited in paragraph 6 above.

Regarding claims 34, 63, 67, 72, 104, 110, 112, 114, 127, 133, 139, 140, 142, 144, 145, Salter's Fig. 5 shows a similar arrangement, including wafer stage 25, reticle plate 5, optical system 20, etc. Fig. 8 shows a carriage 59, a base table 62, etc.

Most importantly, Salter Fig. 8 shows gas bearings 65, 60 for isolating the carriage 59 from the table 62. Fig. 8 further shows a linear motor (or stepping motor) 68 for moving the carriage 59. It is important to note that the linear motor must have coils and magnets, one of the coils and magnets is located on the table 62, and the other of the coils and magnets is located on the carriage 59. The coils and the magnets are in a non-contact arrangement, and also no

guidance between them. The same structure is also shown in Hinds teaching explained in paragraph 6 above.

Regarding claims 64, 68, 101, 111, 113, 125, 128, 141, 143, 155, Salter's column 9, lines 49-50 clearly shows the yaw error correction.

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

10. Any inquiry concerning this communication should be directed to Bentsu Ro at telephone number (703) 308-3656.

December 20, 2001

Bentsu Ro
BENTSU RO
PRIMARY EXAMINER